User manual

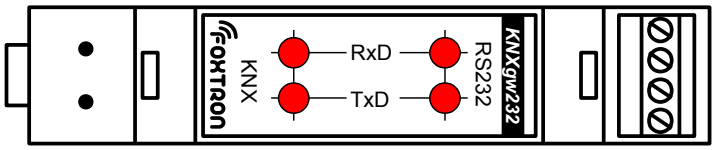
rev. 1.5

KNXgw232

- KNX telegrams to RS232 converter
- RS232 with ASCII protocol
- LED status indication
- galvanic isolation of KNX and RS232
- no need of external power supply
- easy DIN rail mounting
- small dimensions (1 module)
- setting software free to download

Technical specification		
number of KNX addresses	250	
power consumption	8	mA
wires cross section (RS232)	0,08 ÷ 1,5	mm^2
wires cross section (KNX)	0,6 ÷ 0,8	mm^2
galvanic isolation	2	kV
ingress protection rating	IP20	
working ambient temperature	0 ÷ 50	°C
storage temperature	-10 ÷ 70	°C
weight	40	g

LED indicators	
RS232 RxD	received message from RS232
RS232 TxD	transmitted message to RS232
KNX RxD	received telegram from KNX
KNX TxD	transmitted telegram to KNX



Power supply, Galvanic isolation

There are two possibilities how to power the converter. First - the KNX bus is isolated from RS232 bus (default setting). KNX part of converter is powered directly from KNX bus, RS232 part has to be powered from external power supply (through V+ terminal). Second - KNX and RS232 are both powered from KNX bus. There is no need of external power supply in this case. There is a small hole (2,54 mm) in bottom cover of converter to make checking of the setting possible. If you can't see red jumpers in the hole, the buses are isolated. In other case they are not isolated one from the other.

	galvanic isolated buses		***galvanic connected buses***	
power supply	KNX	V+	KNX	V+
	6mA	2mA / 5-24V	8mA	unused
JP1, JP2	open		closed	

Galvanic isolated buses KNX and RS232

bottom view without bottom cover (isolated buses)

In default settings the buses are isolated. Unused jumpers are placed on holders in middle part of converter.

Galvanic connected buses KNX a RS232

If you want to power the whole converter only from KNX bus, remove bottom cover and close the JP1 and JP2 with red jumpers. Do non remove the electronics from the box! You could damage small electronic parts!

bottom view without bottom cover (galvanic connected buses)

The converter is powered from KNX you don't need any external power supply and terminal V+ remains unused.

Communication description

External device communicates with gateway by easy protocol which confirms to the American Standard Code for Information Interchange (ASCII).

Type of communication Master – Slave. External device starts communication by command (Master) and gateway answers (Slave)
Telegrams for external devices incoming from KNX bus are stored in buffer of gateway. External device reads them one after another (First In First Out). Buffer is able to keep up to 8 telegrams.

Protocol characteristic

data rate	19200 bps
character size	8 bits
parity	even
number of stop bits	1

Structure of message

Query or answer containing data

<STX>
command type
data
check sum
<CR>

Answer without data (acknowledge)
Command accepted:

<ACK>

Command refused:

<NAK>

<STX> start of message – 2 (0x02)
<CR> end of message – 13 (0x0D)
<ACK> confirmation of command – 6 (0x06)
<NAK> rejection of command – 21 (0x15)
<NAK> is answered in case, that given address is not set in gateway, or the length of date (format) is wrong.

All the other bytes (command type, data, check sum) are numbers in hex format (0x00 – 0xFF) in ASCII coding – into two bytes in range „0“ – „9“ (0x30 – 0x39) or „A“ – „F“ (0x41 – 0x46).

Example: Command type 0x04 (query received telegram from KNX) is written in two bytes „0“ – 0x30 and „4“ – 0x34.
The whole query command for received telegram from KNX:
<STX> 0x04 0xFB <CR> is transmitted in 6 bytes (1B <STX>, 2B command, 2B check sum and 1B <CR>).

The whole message on RS232 will look as follows: 0x02, 0x30, 0x34, 0x46, 0x42, 0x0D.

Command types

command type	description
0x01	query gateway firmware version
0x04	query received telegram from KNX bus
0x0B	store data in group address on KNX
0x0C	query data from group address on KNX

Configuration commands for setting of converter KNXgw232

command type	description
0x40	load the list of listened addresses from converter KNXgw232
0x41	store the list of listened addresses from converter KNXgw232

Check sum calculation

Check sum is calculated according to the following rule:
8-bit addition of all bytes of message except for bytes STX and CR and negation the result bit by bit.

Example: (query data from group address 1/1/1)
STX 0x0C 0x09 0x01 0xE9 CR
0x0C + 0x09 + 0x01 = 0x16
Negation of the byte 0x16 results in the check sum 0xE9

Query gateway firmware version

Query:
command type 0x01
data *not used*

Answer
command type 0x81
data gateway firmware version – 2 bytes
Version is in format x.y, first byte represents x and second byte y.

Example
Command <STX> 0x01 0xFE <CR>
Answer <STX> 0x81 0x01 0x15 0x68 <CR>
Firmware version is 1.21 (0x01.0x15)

Query received telegram from KNX bus

Query:

command type	0x04
data	*not used*

Answer

command type	0xFC
data	group address – 2 bytes data – n bytes
or	<ACK> No new data have been received from KNX bus.

Example

Command	<STX> 0x04 0xFB <CR>
Answer	<STX> 0xFC 0x09 0x01 0x07 0xF2 <CR> New received data 0x07 from address 1/1/1 .
or	<ACK> No new data have been received from KNX bus

Store data in group address on KNX

Store:

command type	0x0B
data	group address – 2 bytes transmit priority – 1 byte (0x0C or 0x04) data – n bytes

Answer

	<ACK>
or	<NAK>

Example

Command	<STX> 0x0B 0x09 0x01 0x0C 0x07 0xD7 <CR>
Answer	<ACK> Data 0x07 were stored in group address 1/1/1.

Allowed transmit priority: 0x0C for low priority level
0x04 for high priority level.

Query data from group address KNX

Query:

command type	0x0C
data	group address – 2 bytes

Answer

	<ACK>
or	NAK>

Example

Command	<STX> 0x0C 0x09 0x01 0xE9 <CR>
Answer	<ACK>
	Query transmitted to group address 1/1/1.

List of listened addresses setting

The command configures the converter KNXgw232. If the setting of converter is done by *Configate* software the configuration command will not be used.

Store setting into the converter :

command type	0x41
data	position of item in converter memory (2 bytes) 0-249 – list of listened group addresses 65535 (0xFFFF) physical address of converter KNX address (2 bytes) group or physical address 0xFFFF means, in case of group address, that this position will not be used (deleting of item) Data type group address format (1=EIS1 and so on) In case of physical address set to 0.

Answer

command type	0xC1
data	position of item in converter memory (2 bytes) 0-249 – list of listened group addresses 65535 (0xFFFF) physical address of converter KNX address (2 bytes) group or physical address 0xFFFF means, in case of group address, that this item is not used. Data type group address format (1=EIS1 and so on)

Example

Command	<STX> 0x41 0x00 0x00 0x09 0x03 0x01 0xB1 <CR>

Save group address 1/1/3 (0x09,0x03) with format EIS1 (0x01) into first position in memory (0x00,0x00).

Answer <STX> 0xC1 0x00 0x00 0x09 0x03 0x01 0x31 <CR>
Group address 1/1/3 (0x09,0x03) with format EIS1 (0x01) is saved in first position in memory (0x00,0x00).

List of listened addresses upload

The command upload the list of listened addresses from the converter KNXgw232. If the setting of converter is done by *Configate* software the configuration command will not be used.

Upload

command type 0x40
data position of item in memory of converter KNXgw232 (2 bytes)
0-249 – list of listened group addresses
65535 (0xFFFF) physical address of converter

Answer

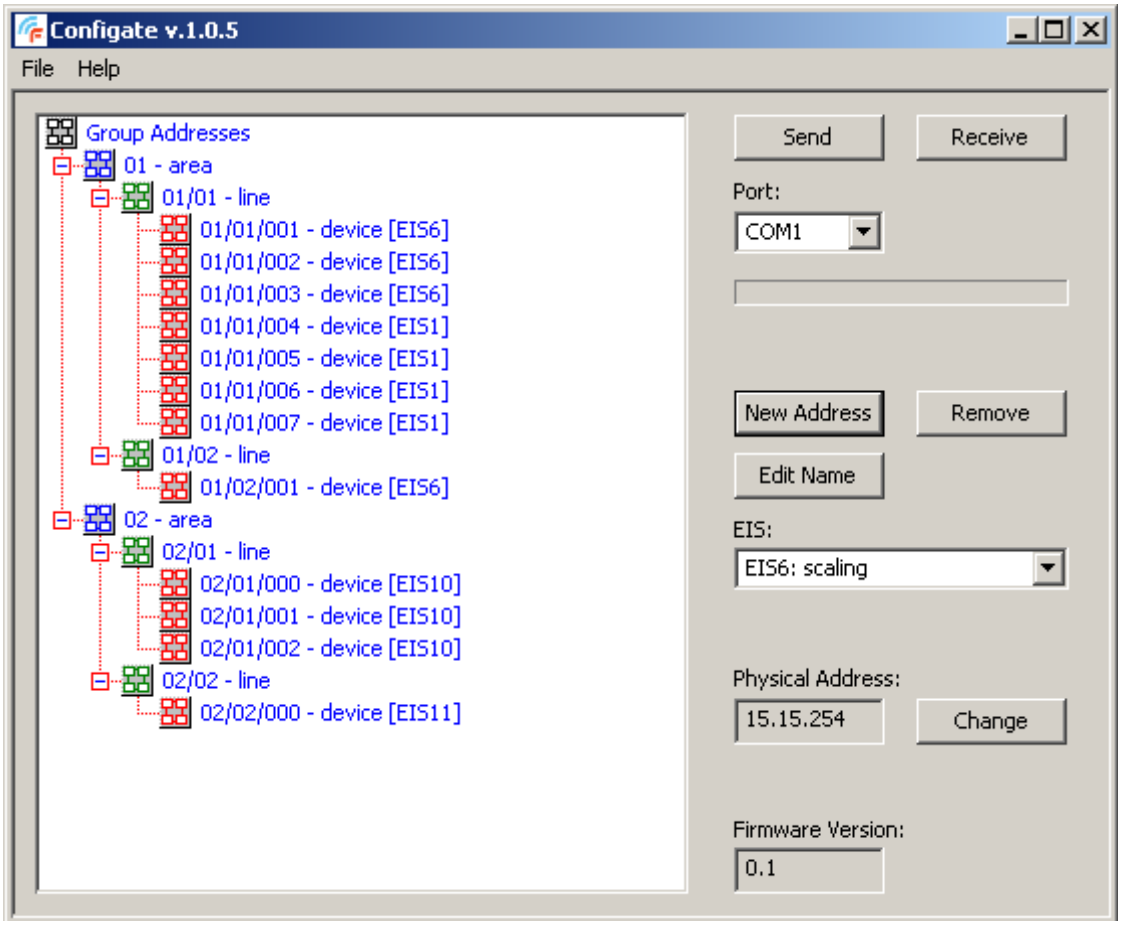
command type 0xC0
data position of item in memory of converter KNXgw232 (2 bytes)
0-249 – list of listened group addresses
65535 (0xFFFF) physical address of converter
KNX address (2 bytes)
group or physical address
0xFFFF means in case of group address, that this item is not used.
Data type
group address format (1=EIS1 and so on)

Example

Command <STX> 0x40 0x00 0x00 0xE9 <CR>
Upload the group address from the first position of memory of converter
Answer <STX> 0xC0 0x00 0x00 0x09 0x03 0x01 0x32 <CR>
Group address 1/1/3 (0x09,0x03) with format EIS1 (0x01) is saved in first position of memory (0x00,0x00).

Address setting

Easy configuration software *Configate.exe* runs under OS Windows 2000 and later. It serves as a tool for setting group and physical addresses of actors and sensors connected to KNX bus. Each group address to be used by external device must be programmed in the gateway. *Configate* can be downloaded for free from: http://www.foxtron.eu



Software manual

A tree with group addresses can be created by following buttons:

New Address - inserts new item with address *area, line* or *device*. The item is inserted as subnode under selected node.

Remove - deletes selected item, including all subnodes.

Edit Name - using this button the name of selected item can be changed.

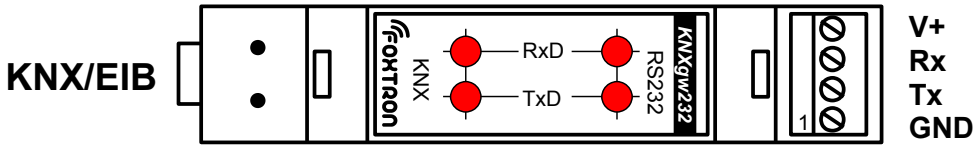
A format of telegrams (EIS) of selected *device* items can be chosen from the list in **EIS** menu.

Created address tree can be saved by command **Save** in menu **File**. Default extension of saved files is *.cg*. Saved address tree can be load by command **File -> Open**. By command **File -> New** will be current tree deleted and new one created.

Created address tree can be stored into the gateway KNXgw232 or read from it by buttons **Send** and **Receive**. Appropriate serial port with gateway can be selected in **Port** menu.

Physical address can be changed by button **Change.** The software will ask for all three parts of address one after another.

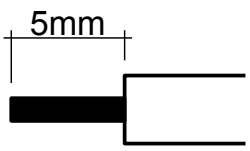
Terminal connection



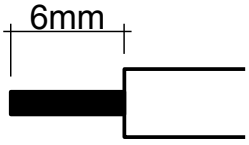
RS232 terminal description	
V+	5-24V – power supply of RS232 part in case of galvanic isolated buses
Rx	RS232 received data
Tx	RS232 transmitted data
GND	RS232 signal ground (in case of galvanic isolation – ground for supply of RS232 part)

Terminal V+ serves for power supply of RS232 part of the gateway if KNX and RS232 are isolated (see part “power supply, galvanic isolation”).
If the buses are not isolated, the whole gateway is supplied from KNX bus and terminal V+ is not used.

Wire preparation:

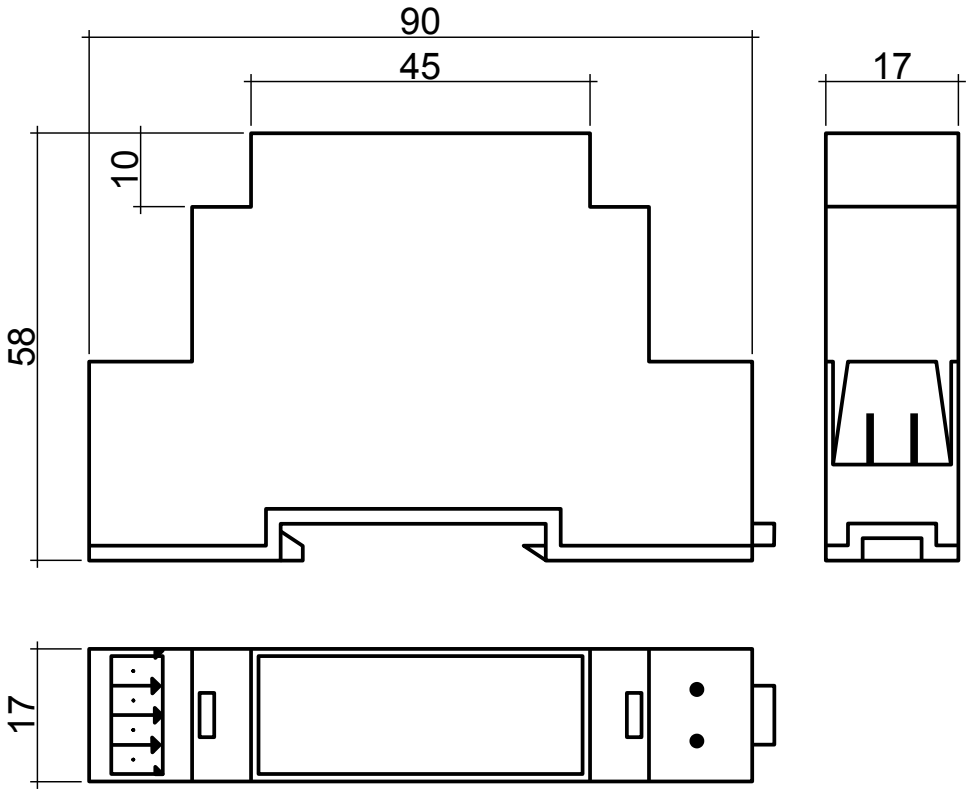


0,6 – 0,8mm^2



0,08 – 1,5mm^2

Dimension (mm)



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